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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

LY, ANH VU H

ART UNIT

PAPER NUMBER

2616

MAIL DATE

DELIVERY MODE

05/02/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/972,814	LEE ET AL.	
	Examiner	Art Unit	
	ANH-VU H. LY	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-5,7,8,11,12,14,15,17,18,21,22,24,25,27 and 38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,5,7,8,11,12,14,15,17,18,21,22,24,25,27 and 38 is/are rejected.
- 7) ☒ Claim(s) 4 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This communication is in response to Applicant's amendment filed January 29, 2008.

Claims 1, 3-5, 7-8, 11-12, 14-15, 17-18, 21-22, 24-25, 27, and 38 are pending.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3, 5, 7-8, 11-12, 14-15, 17-18, 21-22, 24-25, 27 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art disclosed in the specification on pages 1-10 and Figs. 1-10 and further in view of Heikkinen (WO 95/32558) and further in view of Lamoureux et al (US Patent No. 6,330,458 B1). Hereinafter, referred to as APA, Heikkinen, and Lamoureux.

With respect to claims 1, 5, 8, and 18, APA discloses a transmission apparatus in a CDMA mobile communication system (Fig. 10) for transmitting a modulated radio signal using a plurality of antennas (Fig. 10, elements ANT1 and ANT2), the transmission apparatus comprising:

a power amplifier for amplifying the radio signal in a transmission period (Fig. 10, element 1026 or 1038);

the sub-frame includes a plurality of time slots, each time slot includes a transmission period followed by a non-transmission period (Figs. 2 and 3).

APA does not disclose a controller for generating a switching control signal and a switch for switching the amplified radio signal from the power amplifier between a first and a second antenna in response to the switching control signal.

Heikkinen discloses controller (Fig. 3, element 35) for generating a switching control signal associated with the radio signal amplified by the power amplifier (Fig. 3, element 32) and a switch (Fig. 3, element 33) for switching the amplified radio signal from the power amplifier between a first and a second antenna (Fig. 3, elements 34a, 34b, and 34c) in response to the switching control signal.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include generating a control signal for switching radio signal between a first and a second antenna in APA' system, as suggested by Heikkinen, to reduce internally generated heat in each antenna and to promote the endurance of each antenna.

Neither APA nor Heikkinen disclose that the switching control signal generated such that the switching occurs only in a non-transmission period of a last time slot within a sub-frame.

Lamoureux discloses that the scanning radio continues to monitor each of antenna 302 and 304 during **each of the time slots** and selects which antenna should be coupled to a radio during a particular time slot, coupling the antenna to the radio during the guard time of the time slot (col. 5, lines 40-45). Herein, as illustrated in Fig. 4, the sub-frame 401 includes a plurality of time slots, e.g., TS1-TS6. Therefore, monitoring each of antennas during each of the time slots implies that each time slot would be monitored including time slot 416 TS6. Herein, time slot

TS6 is the last time slot in the sub-frame 401 and the selected antenna coupled to radio during a guard time of the last time slot.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to perform switching during the guard period of the last time slot in the sub-frame in APA's system, as suggested by Lamoureux, to prevent users from hearing any signal disturbance such as noise that can occur during the switching between antennas.

With respect to claims 3 and 7, APA discloses that wherein the non-transmission period of the last time slot has a length of 96 chips (Fig. 1, GP has 96 chips).

With respect to claims 11, APA discloses that wherein the guard period has a length of 96 chips (Fig. 3, GP has a length of 96 chips).

With respect to claims 12 and 22, APA discloses that wherein the guard period is a downlink non-transmission period of a sub-frame (Fig. 3, DwPTS).

With respect to claims 14 and 24, APA discloses that wherein the downlink non-transmission period is 875 usec (page 18, lines 16-18).

With respect to claims 15 and 25, APA discloses that wherein the guard period is an uplink non-transmission period of the sub-frame (Fig. 3).

With respect to claims 17 and 27, APA discloses that wherein the uplink non-transmission period is 825 usec (page 18, lines 21-22).

With respect to claim 21, APA discloses that wherein the guard period has a length of 16 chips (Fig. 4, GP has a length of 16 chips).

With respect to claim 38, APA discloses a transmission apparatus in a CDMA mobile communication system for transmitting a modulated radio signal using a plurality of antennas (Fig. 7), the transmission apparatus comprising:

- an encoder for encoding data (Fig. 7, element 700);
- an interleaver for interleaving the encoded data (Fig. 7, element 702);
- a demultiplexer for demultiplexing the interleaved data into I channel data and Q channel data (Fig. 7, element 704);
- an I channel spreader for spreading the I channel data (Fig. 7, element 706);
- an I channel scrambler for scrambling the spread I channel data (Fig. 7, element 710);
- a Q channel spreader for spreading the Q channel data (Fig. 7, element 708);
- a Q channel scrambler for scrambling the spread Q channel data (Fig. 7, element 712);
- a time division multiplexer for time multiplexing the spread I channel data with an I channel midamble sequence and multiplexing the spread Q channel data with a Q channel midamble sequence (Fig. 7, element 714 for multiplexing I and Q channel data with I and Q midamble);

an I channel finite impulse response filter for pulse shaping the multiplexed I channel data (Fig. 7, element 716);

a Q channel finite impulse response filter for pulse shaping the multiplexed Q channel data (Fig. 7, element 718);

an I channel multiplier for modulating the pulse shaped I channel data (Fig. 7, element 720);

a Q channel multiplier for modulating the pulse shaped Q channel data (Fig. 7, element 722);

an adder for adding the modulated I channel data and the modulated Q channel data (Fig. 7, element 724);

a power amplifier for amplifying the added I and Q channel data (Fig. 7, element 726);

the sub-frame includes a plurality of time slots, each time slot includes a transmission period followed by a non-transmission period (Figs. 2 and 3).

APA does not disclose a controller for generating a switching control signal and a switch for switching the amplified I and Q channel data between a first and a second antenna in response to the switching control signal.

Heikkinen discloses controller (Fig. 3, element 35) for generating a switching control signal associated with the radio signal amplified by the power amplifier (Fig. 3, element 32) and a switch (Fig. 3, element 33) for switching the amplified radio signal from the power amplifier between a first and a second antenna (Fig. 3, elements 34a, 34b, and 34c) in response to the switching control signal.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include generating a control signal for switching radio signal between a first and a second antenna in APA' system, as suggested by Heikkinen, to reduce internally generated heat in each antenna and to promote the endurance of each antenna.

Neither APA nor Heikkinen disclose that the switching control signal generated such that the switching occurs only in a non-transmission period of a last time slot within a sub-frame.

Lamoureux discloses that the scanning radio continues to monitor each of antenna 302 and 304 during **each of the time slots** and selects which antenna should be coupled to a radio during a particular time slot, coupling the antenna to the radio during the guard time of the time slot (col. 5, lines 40-45). Herein, as illustrated in Fig. 4, the sub-frame 401 includes a plurality of time slots, e.g., TS1-TS6. Therefore, monitoring each of antennas during each of the time slots implies that each time slot would be monitored including time slot 416 TS6. Herein, time slot TS6 is the last time slot in the sub-frame 401 and the selected antenna coupled to radio during a guard time of the last time slot.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to perform switching during the guard period of the last time slot in the sub-frame in APA's system, as suggested by Lamoureux, to prevent users from hearing any signal disturbance such as noise that can occur during the switching between antennas.

Allowable Subject Matter

3. Claim 4 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

4. Applicant's arguments filed January 29, 2008 have been fully considered but they are not persuasive.

Applicant argues in page 2 that the non-transmission period is a specific period among a variety of non-transmission periods. The period for switching antenna claimed in the claims of the present application is one sub-frame of 5ms. Examiner respectfully disagrees. None of the pending claims recite that the one sub-frame is 5ms.

Applicant further discloses in pages 2 and 3 three steps for determining the period for switching the antenna in a TSTD scheme. However, these steps are not recited in the pending claims.

Applicant furthermore argues in page 3 that the switching occurs only in a non-transmission period of a last time slot within a sub-frame. However, in Lamoureux et al. switching occurs multiple times in a frame. Therefore, switching six times throughout a frame is not and cannot be equated with switching only in a non-transmission period of a last time slot within a sub-frame. Examiner respectfully disagrees. Lamoureux discloses that the scanning radio continues to monitor each of antenna 302 and 304 during each of the time slots and selects which antenna should be coupled to a radio during a particular time slot, coupling the antenna to the radio during the guard time of the time slot (col. 5, lines 40-45). Herein, as illustrated in Fig. 4, the sub-frame 401 includes a plurality of time slots, e.g., TS1-TS6. Herein, time slot TS6 is the last time slot in the sub-frame 401 and the selected antenna coupled to radio during a guard time of the last time slot. In other words, Lamoureux discloses that switching can be occurred or only occurred at the last time slot of a sub-frame.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANH-VU H. LY whose telephone number is (571)272-3175. The examiner can normally be reached on Monday-Friday 7:00am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham can be reached on 571-272-3179. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Avl

/Anh-Vu H Ly/
Primary Examiner, Art Unit 2616